

## **REMARKS**

Claims 1-2, 5, 9-10, 12, 13-21, 27-31, 37, 39, 41-48, 50, 56, 59 and 61 are pending in the present application. Claims 1-21, 26-31, 36-37, 39, 41-42, 49-50, 55-57, 59 and 61 have been rejected under § 103 as being unpatentable over Pahlman et al. (US 6,579,507) (Pahlman) in view of deJong et al. (US 4,196,173) (deJong). Claims 43-48 have been rejected under § 103 as being unpatentable over Pahlman in view of deJong and Harmer et al. (US 6,001,762) (Harmer). Claims 43-48 have also been rejected under § 103 as being unpatentable over Leppin et al. (US 6,475,451) (Leppin) in view Harmer.

Dependent claims 13, 26, 36, 55, and 57 have been canceled. Various claims have been amended. The status of non-elected claims 62-69 has been added.

Independent claims 1, 21, 27, 37, and 56 have been rejected under § 103 as being unpatentable over Pahlman in view of deJong. Applicants assert that Pahlman in view of deJong does not teach or suggest the amended claims.

Pahlman discloses the use of an acid-washing step in the regeneration of a metal oxide sorbent for the purpose of dissolving contaminant salts collected on the sorbent. Halide acids are not specified in Pahlman. The Office Action relies on deJong as disclosing inorganic acids, including HCl, to allege that it would have been obvious to one of ordinary skill in the art to use the inorganic acid of deJong in the sorbent regeneration method of Pahlman.

Amended claim 1 recites a method of regenerating a used activated carbon sorbent comprising "creating an activated carbon sorbent mixture containing used regenerated activated carbon sorbent and unused activated carbon sorbent," "exposing the activated carbon sorbent mixture to a solution to remove contaminants collected on at least the used activated carbon sorbent to restore mercury sorption effectiveness to the used activated carbon sorbent, the

solution including a salt containing an associated cation," "dewatering the activated carbon sorbent mixture to remove used activated carbon sorbent and at least some contaminants from the solution forming used regenerated activated carbon sorbent and a liquid," "drying the dewatered regenerated activated carbon sorbent from the used regenerated activated carbon sorbent mixture," "treating at least some of the liquid to remove at least some compounds therefrom," and "mixing at least some of the liquid with at least one of used regenerated activated carbon sorbent and unused activated carbon sorbent."

Applicants assert that Pahlman in view of deJong does not teach or suggest amended claim 1. For example, Pahlman in view of deJong does not disclose, among other things, the dewatering, drying, treating, and mixing elements, as they are recited in amended claim 1.

For at least these reasons, applicants assert that amended claim 1 is allowable over the cited prior art. Since dependent claims 2, 5, 9, 10, 12, and 14-20 depend from amended claim 1, it is also believed that these claims are allowable over the cited prior art.

Amended claim 21 recites a method of regenerating a used activated carbon sorbent comprising "exposing the used activated carbon sorbent to a solution to remove contaminants collected on the used activated carbon sorbent to restore mercury sorption effectiveness to the used activated carbon sorbent," "dewatering the used activated carbon sorbent to remove used activated carbon sorbent and contaminants from the solution forming a liquid having contaminants," "adding a promoter comprising at least one of bromine, a bromine compound, and combinations thereof to the activated carbon sorbent," "drying the dewatered used activated carbon sorbent forming a regenerated used activated carbon sorbent," and "treating at least some of the liquid to remove at least some contaminants therefrom."

Applicants assert that Pahlman in view of deJong do not teach or suggest amended claim 21. For example, Pahlman in view of deJong does not disclose, among other things, the dewatering, adding a promoter, drying, and treating elements, as they are recited in amended claim 21.

For at least these reasons, applicants assert that amended claim 21 is allowable over the cited prior art.

Amended claim 27 recites a method of regenerating a used sorbent and enhancing unused sorbent comprising "creating an activated carbon sorbent mixture containing used activated carbon sorbent and unused activated carbon sorbent, the activated carbon sorbent and unused carbon sorbent comprising at least one composition of granulated form and fibrous form," "regenerating the used activated carbon sorbent by exposing the activated carbon sorbent mixture to a solution to remove contaminants collected on the used activated carbon sorbent to restore mercury sorption effectiveness to the activated carbon sorbent, the solution including a compound made up of at least one of bromine, bromine compounds, and combinations thereof for low-ash and fiber sorbent regeneration," and "exposing the regenerated used activated carbon sorbent to a flue gas stream."

Applicants assert that Pahlman in view of deJong do not teach or suggest amended claim 27. For example, Pahlman in view of deJong does not disclose, among other things, the creating, regenerating, and exposing elements, as they are recited in amended claim 27.

For at least these reasons, applicants assert that amended claim 27 is allowable over the cited prior art. Since dependent claims 28-31 depend from amended claim 27, it is also believed that these claims are allowable over the cited prior art.

Amended claim 37 recites a method of enhancing the effectiveness of an activated carbon sorbent for capturing mercury comprising "exposing the activated carbon sorbent to at least one of bromine, bromine compounds, and combinations thereof," and "modifying the carbon edge structure of the activated carbon sorbent to form carbocations so that the activated carbon sorbent accepts electrons from neutral mercury atoms of the mercury."

Applicants assert that Pahlman in view of deJong do not teach or suggest amended claim 37. For example, Pahlman in view of deJong does not disclose, among other things, the exposing and modifying elements, as they are recited in amended claim 37.

For at least these reasons, applicants assert that amended claim 37 is allowable over the cited prior art. Since dependent claims 39, 41 and 42 depend from amended claim 37, it is also believed that these claims are allowable over the cited prior art.

Amended claim 56 recites a method of removing mercury or other pollutants in a flue gas stream during the burning of fossil fuels, comprising "exposing an activated carbon sorbent mixture to the flue gas stream to remove at least mercury as a contaminant from the flue gas stream forming a used activated carbon sorbent," "mixing the used activated carbon sorbent with fresh activated carbon sorbent and exposing the mixture of used activated carbon sorbent and fresh activated carbon sorbent to a solution including bromine, bromine compounds, and combinations thereof to remove contaminants collected on the used activated carbon sorbent to restore mercury sorption effectiveness to the used activated carbon sorbent and enhance sorption effectiveness of the fresh active carbon sorbent, the solution including an associated cation, such as ammonium, aluminum, boron, zinc, and iron," "dewatering the solution to remove used activated carbon sorbent and any fresh activated carbon sorbent and contaminants from the solution," "drying the used activated carbon and unused activated carbon sorbent particles," and

"exposing the dried used activated carbon sorbent and the fresh activated carbon sorbent to the flue gas stream to remove additional contaminants from the flue gas stream."

Applicants assert that Pahlman in view of deJong do not teach or suggest amended claim 56. For example, Pahlman in view of deJong does not disclose, among other things, the exposing, mixing, dewatering, and drying elements, as they are recited in amended claim 56.

For at least these reasons, applicants assert that amended claim 56 is allowable over the cited prior art. Since dependent claims 59 and 61 depend from amended claim 56, it is also believed that these claims are allowable over the cited prior art.

Independent claim 43 has been rejected under § 103 as being unpatentable over Pahlman in view of deJong and Harmer, and over Leppin in view Harmer.

The Office Action relies on Pahlman as disclosing a method for regenerating a sorbent comprising removing used sorbent in a multi-stage manner, exposing it to a dilute acid solution, and recovering the sorbent by removing and drying. The Office Action relies on Harmer as disclosing bromine, to allege that it would have been obvious to one of ordinary skill in the art to use the bromine of Harmer in the regeneration process of Pahlman.

The Office Action relies on Leppin as disclosing a method for regenerating a sorbent comprising injecting sorbent into a gas stream, removing in stages, and exposing it to an acid solution. The Office Action relies on Harmer as disclosing bromine, to allege that it would have been obvious to one of ordinary skill in the art to use the bromine of Harmer in the regeneration process of Leppin.

Amended claim 43 recites a method of enhancing the effectiveness of an activated carbon sorbent by modifying the structure of the activated carbon sorbent in a mixture of ash and activated carbon sorbent comprising "enhancing the activated carbon sorbent by exposing the

activated carbon sorbent in a mixture of ash and activated carbon sorbent to one of an aqueous solution and a nonaqueous solution that increases sorbent effectiveness, the solution including one or more of bromine, bromine compounds, and combinations thereof, for the mixture of ash and activated carbon sorbent for the regeneration thereof," and "exposing the regenerated enhanced activated carbon sorbent to a flue gas stream."

Applicants assert that neither Pahlman in view of deJong and Harmer, nor Leppin in view Harmer teach or suggest amended claim 43. For example, the combinations of cited references do not disclose, among other things, modifying the structure of the activated carbon sorbent in a mixture of ash and activated carbon sorbent by exposing an activated carbon sorbent, as recited in amended claim 43.

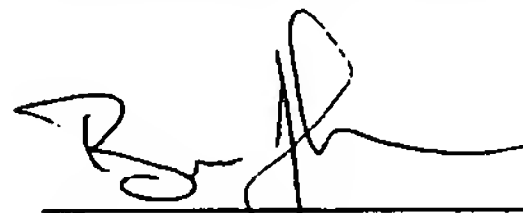
For at least these reasons, applicants assert that amended claim 43 is allowable over the cited prior art. Since dependent claims 44-48 and 50 depend from amended claim 43, it is also believed that these claims are allowable over the cited prior art.

It is respectfully submitted that all claims are patentable over the cited prior art. It is furthermore respectfully submitted that all other matters have been addressed and remedied and that the application is in form for allowance. Should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Bruce A. Johnson, Applicants Attorney at 512-301-9900 so that such issues may be resolved as expeditiously as possible. Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 to



deposit account number 50-3864 (Johnson & Associates).

Respectfully Submitted,



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